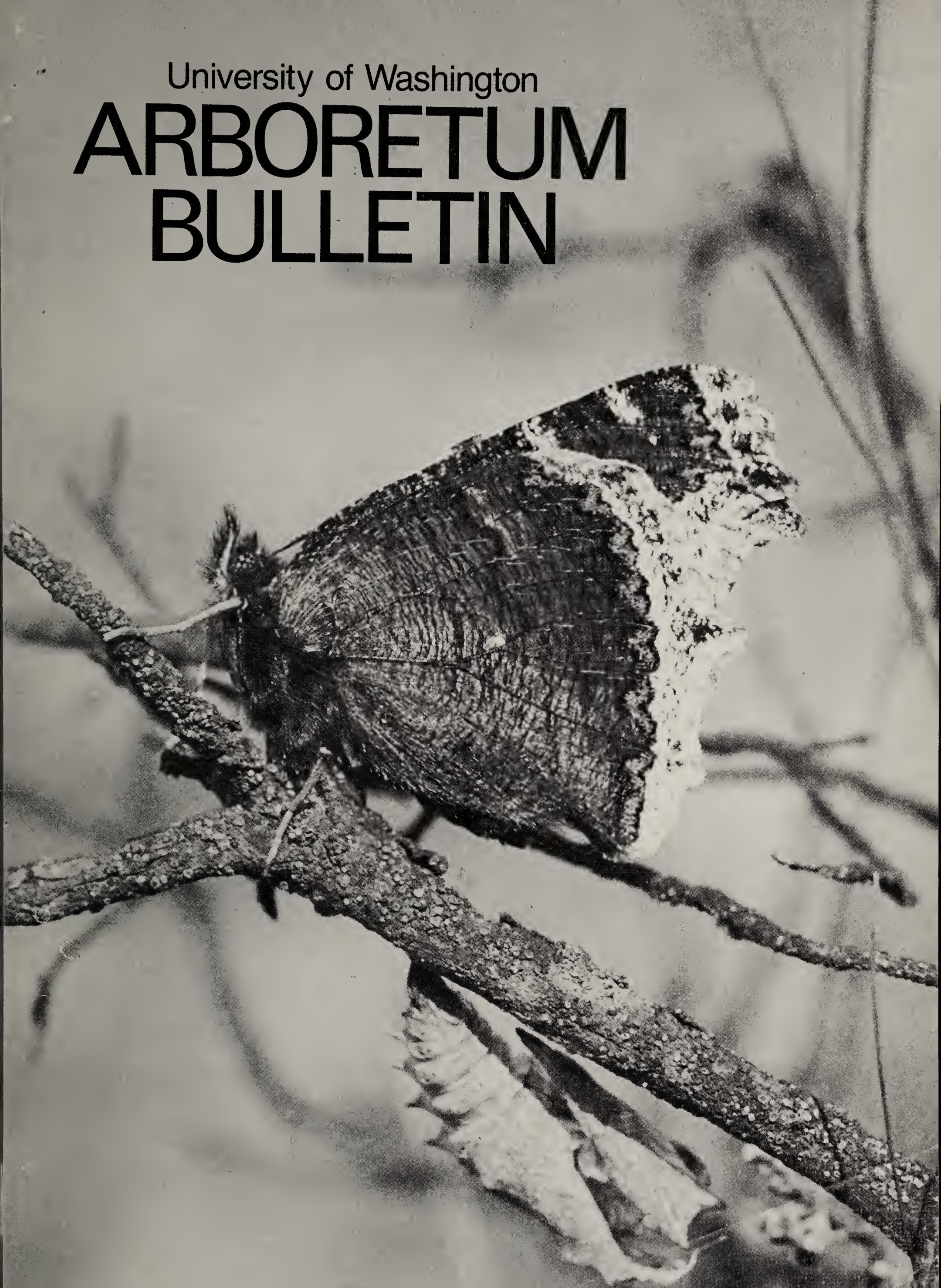
University of Washington

ARBORETUM BULLETIN



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PRESIDENT'S MESSAGE

With the annual meeting on June 3, we have completed another year of activity. As of year-end, the Foundation is growing and healthy, whether measured by size of membership, financial capacity, or by public service and by direct grants in support of the Arboretum.

On the other hand, progress in defining the future course for the Arboretum has been painfully slow, and inflation is radically offsetting our ability to accumulate funds for future improvements.

The officers and directors who retired June 3 have contributed substantially to this growth and health, often under difficult circumstances. They deserve our heartfelt thanks for their efforts and I am particularly in their debt for their support and concern.

The incoming officers will continue to face many of these same circumstances but I believe that the atmosphere of cooperation is improving and that by concentrating on the several areas of agreement among the city, the university and various citizen groups that we should be able to accomplish significant progress in 1976-77.

Thank you for your continued support of the Arboretum Foundation.

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University of Washington
ARBORETUM BULLETIN

VOLUME 39, NUMBER 2, 1976

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COVER
Mourning-cloak Butterfly
(Nymphalis antiopa)

Photo: Niko Tinbergen

Photo: Niko Tinbergen

Fig. 1. Two blue butterflies (Lycaenids) in typical sleep position — head down. Similar sleeping Lycaenids can frequently be found in the Arboretum on sprigs of grass.

BUTTERFLIES IN THE ARBORETUM

*BASTIAAN J. D. MEEUSE**

From time immemorial, the beauty of butterflies has fueled the imagination of mankind. Their metamorphosis, from an often unappealing and sluggish larva, the caterpillar, to a gossamer-winged, ethereal and many-hued creature that seems to be borne on wind and sunshine, can be seen as a symbol of the emergence of man's soul. In Greek mythology, young ladies of great pulchritude were sometimes transformed into butterflies. The modern lover of butterflies is also in very good company. Winston Churchill had his own butterfly expert who would regularly stock the gardens of Chequers, the offical country estate of British prime ministers, with butterflies for the delight of the guests. Vladimir Nabokov, author of *Lolita* and other books, is a recognized expert on the Lycaenids — the little blues, coppers and hairstreaks. And so on!

The scientific importance of butterflies, which has emerged only in the last 120 years or so, is great. It is now generally recognized that the appearance of these creatures and their larvae lends valuable support to theories of survival based on warning colors, camouflage and mimicry. Here is an area where the artist and the scientist meet — and make friends!

Seattleites are indeed fortunate in that they can observe without any special effort at least 15 species of butterflies in their gardens and parks, including our Arboretum. One can begin butterfly watching as early as the middle of March.

A Biography of the Mourning-Cloak Butterfly

Among the first butterflies to make their appearance in the Arboretum are usually mourning-cloaks *(Nymphalis antiopa)*, California tortoiseshells *(Nymphalis californica)* and satyr

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*Dr. Meeuse, Professor in Botany at the University of Washington and a member of the editorial board, is known to our readers for his articles "Seeds and Fruits and their Dispersal Strategies" (XXXVI:3, Fall, '73 and XXXVII, 1, Winter, '74) and "What's New in Pollination" (XXXV, 3, Fall, '72) as well as his book *The Story of Pollination* (Ronald Press, '61). This is the first of a two-part article.

anglewings *(Polygonia satyrus)*. Why are these animals so often in mint condition? Clearly they have hibernated here in the Northwest in some sheltered spot such as a hollow tree, a loft or an outhouse, rather than having finished a long hazardous journey from the southland. The *Polygonia*s, however, are exceptions for they winter here by simply sitting stiff on a twig or branch in the open.

The observable fact of hibernation should torpedo the myth that adult butterflies live for one day only. Indeed, at our latitude where mourning-cloaks produce only one generation per year, the winged insects are around for no less than 9 or 10 months. Hatching in July, and sustaining themselves on the nectar of various flowers, mourning-cloaks can be seen throughout the late summer and early fall on such plants as butterfly-bush *(Buddleia)*, goldenrod *(Solidago)*, asters and dahlias. The individuals that survive hibernation mate in late spring and deposit eggs like tent-caterpillar moths, as collars around the small twigs or leaf stalks of willows, birches or poplars. The caterpillars, spiny and black with orange-red patches on their backs, remain together in large clusters. Bad-tasting to birds, they are typical examples of animals with warning-colors. Their gregariousness is exactly what one should expect, for their mass effect makes them even more conspicuous. What they are actually doing is *advertising* their unpleasantness! A young and inexperienced bird may try to eat a mourning-cloak caterpillar and may even kill it in the act. However, the experience is so bad that the greenhorn, remembering the bold color pattern, will from that moment on and for a long period of time give a wide berth to all mourning-cloak larvae and to similarly colored animals such as certain wasps and flies. One can say that the species with the warning-colors are paying a small tax in the form of killed or wounded animals to educate their enemies!

When the caterpillars have reached maturity, they let themselves drop or crawl off the host tree and scurry away in all directions, each one following a straight path. The sun probably guides them in this. Gradually, the animals slow down and after an hour or so they will climb up against any tall, erect object (normally a tree) to pupate.

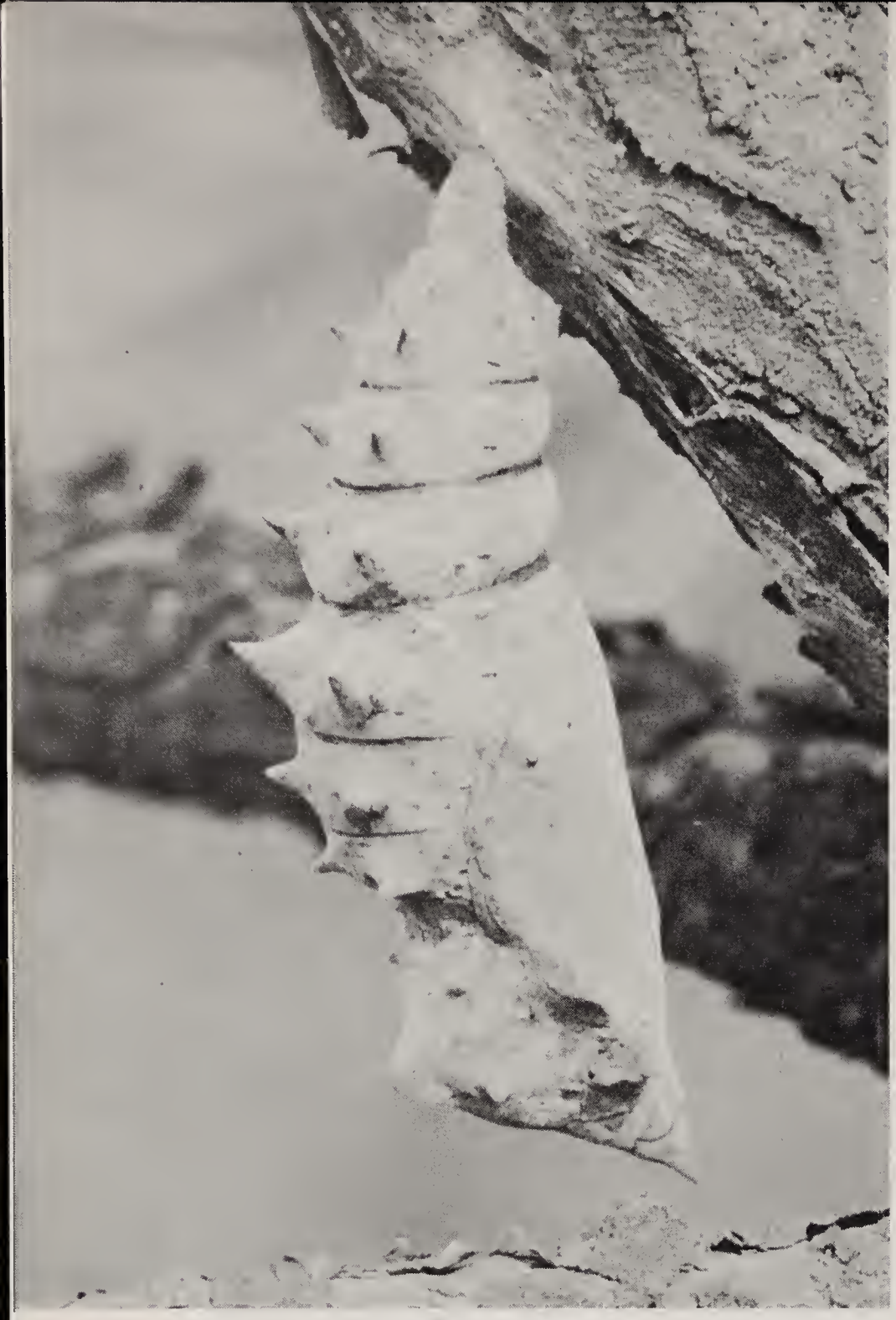
The Drama of Pupation

To watch a caterpillar, especially one of a nymphalid species such as mourning-cloak, tortoiseshell, Lorquin's admiral, or anglewing, go through the acrobatics of pupation is always a breathtaking spectacle. When ready, a nymphalid larva always starts by spinning a beautiful little mat of silk, usually on the underside of a branch. A caterpillar raised in captivity spins its mat on the ceiling of the rearing case. The animal now hooks itself into this mat very firmly with its rear legs, releases its front end and hangs head down in the shape of a J (Fig. 2). It also begins to shrink a little, as all mature caterpillars do at this stage.

After a certain time has elapsed, the caterpillar's skin bursts open a little ways behind the head, and the chrysalis which has already been formed within the old "envelope" emerges. By making slight wriggly motions, the chrysalis emerges slowly, pushing the larval skin upwards towards the point of attachment on the branch. It is indeed a precarious operation, for after all a chrysalis does not have movable limbs. One anticipates that it will fall down to its doom — which *does* indeed happen occasionally! How

Fig. 2. Caterpillar of mourning-cloak butterfly (*Nymphalis antiopa*). The position (J-shape, head down) is characteristic for the group to which this butterfly belongs.

Photo: Niko Tinbergen



Figs. 3, 4, 5, 6. (clockwise, upper l. to r.) Pupating caterpillar (chrysalis appr. 1 inch or 2.5 cm) and hatching sequence of mourning-cloak butterfly. Time span — about 1 hour.

Photos: Niko Tinbergen

can the chrysalis possibly come out of its larval envelope completely to hook itself into the silken mat that is so essential? The secret is that the last segments or rings of the chrysalis's body have tiny hooks or grapples that are used to hang onto the inside of the remaining little stretch of larval skin. The very tip of the abdomen, which also has a most efficient little grapple, comes out and with frantic circular or twisting movements anchors the chrysalis firmly to the mat. The chrysalis can then finally let go completely of the larval skin (Fig. 3).

A caterpillar's silk is produced as a liquid by a pair of glands in the head. It emerges near the mouth and hardens quickly by oxidation accompanied by water uptake to form the familiar thread. In many caterpillars the emergence of the thread can be observed beautifully.

(Commercial silk is spun by the larva of a moth, the silkworm. In this case, however, the strong threads that are so resistant against all sorts of deleterious influences are used for making the cocoon or case that surrounds the chrysalis.)

Not all caterpillars pupate in the same manner. In contrast to the caterpillars of nymphalids, those of the whites and swallowtails when ready to pupate, look for a *vertical* support, not a ceiling. The animal itself assumes a vertical position, heads up, often against a wall or the stem of its food plant. A girdle made of silk holds the chrysalis of the swallowtail and the whites in an upright position (Fig. 7).

After assuming this position, the caterpillar first secures a foothold for the hindmost pair of legs by spinning a small silken mat to which they can be attached. Constructing and looping the girdle over its back and middle requires genuine acrobatics. Actually the girdle is a composite made of a number of separate thin strands. By moving its head back and forth over its back, the caterpillar manufactures from each of these strands a loop which is attached at one point to the stem or wall. Some time after the composite girdle is finished, the caterpillar's skin bursts open and the chrysalis emerges. From them on, the events are similar to those described for the nymphalid pupation. The old skin is compressed and pushed *downwards* and is finally cast off with some energetic movements. Immediately after this, the chrysalis wriggles briefly but frantically until the grapples at the very tip of the abdomen are firmly anchored to the silken mat.

Photo: B. J. D. Meeuse

Fig. 7. Chrysalis of a sulfur butterfly on alfalfa. Notice the girdle and silken mat and compare with the mourning-cloak chrysalis (Fig. 3).

Even the storms of autumn and winter will not dislodge a small body that is so ingeniously attached to its support!

Natural Defenses of Mourning-Cloak Chrysalids and Adults

The well-camouflaged and scattered hanging chrysalids of mourning-cloaks attached by tiny hooks on their rear end to little silk mats which the caterpillars wove before pupation (Fig. 3) are apparently tasty, and some of them may well fall prey to mice or birds. Fortunately, finding a chrysalid does not automatically lead to destruction of the whole brood, as would be the case if the caterpillars had pupated in a group. The biological significance of caterpillars scurrying off in all directions before pupation is now quite obvious!

Nature has given the adult mourning-cloak butterflies two lines of defense: As long as they keep their wings closed, they are beautifully camouflaged; when they spread their wings horizontally as they often do while sunning or sitting on the flat surface of inflorescences, the dark,

velvety maroon of the upper surface edged by the pale yellow margin creates a striking black-and-white effect which is an effective warning pattern. I don't know that mourning-cloak butterflies are really all that unpalatable, but in any case they cash in on the bad reputation of some other black-and-white animals.

If a mourning-cloak butterfly *is* caught, it can do a beautiful act of playing possum. The animal will then lie on its side for some time with its wings tightly closed and its legs and antennae folded up stiffly against the body. Even experienced collectors may see their highly prized catch suddenly "come back to life" and dart away like a flash and escape! Among other nymphalids which know how to play possum is the painted beauty *(Cynthia virginiensis)* occasionally found in the Arboretum.

The Various Ways in Which Butterflies Overwinter

Not all butterflies hibernate as adults; some species do it as eggs, others as chrysalids or young larvae, and a very few will hibernate as adults and chrysalids both. The larval stage is generally favored for hibernation in the meadow-brown (or wood nymph) family, the Satyridae. Many hairstreaks get through the winter in the egg stage, but other groups of the Lycaenidae prefer to spend the cold months as chrysalids. The silver-spotted skipper *(Epargyreus clarus)* hibernates in the soil as a pupa protected by a loose cocoon while other skippers pass the winter as larvae. Swallowtails and whites generally overwinter as chrysalids but there are exceptions, e.g. the alfalfa butterfly *(Colias eurytheme)* which hibernates in the adult stage. Various nymphalids also hibernate in the adult stage: anglewings, (*Polygonia* species), the mourning-cloak butterfly *(Nymphalis antiopa)*, the California tortoiseshell *(N. californica)* and Milbert's tortoiseshell *(N. milberti)*. There is good evidence, though, that in New England both adults and chrysalids of *N. milberti* overwinter.

The famous monarch or milkweed butterfly *(Danaus plexippus)* migrates southward in the fall to spend the cold season and congregates in large (sometimes huge) numbers in special spots, the best-known ones being in Pacific Grove, California, where their yearly arrival is celebrated with great festivities. On the "butterfly trees" one can easily spot the monarchs sitting jam-packed on the beard-like *Usnea* lichens that hang down from the Monterey pines and on *Eucalyptus* trees. Most of the animals keep their wings folded which gives them a measure of camouflage. However, by blowing on a supersonic dog whistle one can cause them to open their wings simultaneously so that the warm, golden orange-brown of the upper wing surface is exposed. This is one of the most gorgeous sights in nature and I recommend it emphatically!

The imitator of the unpalatable monarch, the tasty viceroy *(Limenitis archippus)*, a nymphalid, passes the winter in the larval stage. Both in this species and in its close relative, Lorquin's admiral *(Limenitis lorquini)*, a striking black-and-white butterfly with buffy-rust wingtips, the young caterpillars make a neat little hibernaculum or winter shelter which represents the remaining lower one-fourth or one-third of a willow leaf which the larva has not eaten and has rolled up in the shape of a narrow tent or case. The leaf will not fall off the host-plant as leaves are supposed to do in the fall, because the animals have securely fastened the leaf-stalk to its twig with an anchor of silk.

The Role of Colors and Smells in the Life of a Butterfly

When privet is in bloom one can expect Lorquin's admiral to be near by. Yes — smell probably plays a greater role in the life of Lorquin's admiral than it does in most other butterflies! One can even bait these gorgeous creatures with dead garter snakes. Actually, the relative importance of color and smell as advertizing "signals" in flowers that cater to butterflies is hard to assess. It has been shown that these animals have an inborn tendency to fly towards certain colors, and simply by using colored papers laid out in the field or in a big cage one can show that, like many other insects, they favor yellows and blues. By means of other methods, it has been demonstrated that they also see the near-ultraviolet as a color. Nymphalid butterflies (that is, species in the family of the tortoiseshells and mourning-cloak) do not respond to reds, at least in their feeding-reactions, but whites and swallowtails do, a possible reason why *some* butterfly-pollinated flowers are pure red in color.

Granting the color-sense of butterflies, one can still point out that the visual reactions to

flowers are probably stimulated when a butterfly finds itself in a "cloud" of heavy fragrance. The perfume may well induce a food-seeking mood! A sweet fragrance is indeed among the most important attributes of typical butterfly-pollinated flowers. In addition, these flowers possess long and very narrow corolla tubes which very definitely discriminate against insects with short or bulky mouth parts but enable butterflies with their long, flexible and hair-thin proboscis to exploit them (Fig. 8). They also contain a good amount of nectar that is not too syrupy to handle. The butterfly-pollinated flowers unfold and become "active" in terms of the production of nectar and pollen in the daytime, in contrast to moth-pollinated flowers which usually open and become fragrant in the evening. Another difference with moth-pollinated flowers is based on the fact that butterflies do not feed "on the wing" as hawkmoths and hummingbirds do. They need something to walk on. In some butterfly-pollinated flowers such as those of *Impatiens*, the blades of the petals are at right angles with the often vertical corolla tubes and provide landing platforms. Smaller butterfly-flowers are usually combined in dense inflorescenes whose horizontal, flat or slightly convex surfaces provide a beautiful reception area for our winged friends. The extreme case is the "flower" of the Composites (in reality an inflorescence!). Perhaps it is fair to say that these flowers, dandelions, asters, dahlias, erigerons, etc., are the butterfly-flowers *par excellence*. However, the flowers of our milkweeds *(Asclepias)* and red valerian *(Centranthus ruber)* and those of butterfly-bush *(Buddleia)*, lilac and heliotrope, with their heady fragrance would also qualify easily.

The Butterflies' Sense of Taste

An attribute that stands some of our flower-visiting butterflies in good stead is the possession of taste organs on their feet; one could say that they have their tongues on their toes, although they *also* have taste organs in their mouths. Even an animal that is not thirsty for water will stick out its proboscis as soon as its feet touch nectar, the juice of an overripe fruit, or the fermenting sap that may ooze out of tree trunks riddled with insect larvae. This particular sense of taste has been investigated in a very close relative of Lorquin's admiral in Europe, in mourning-cloaks, and with special thoroughness in the red admiral *(Vanessa atalanta)* which occurs in Eurasia and North America both. We have also found it to be present in painted ladies and skippers. The feet of the red admiral are a few hundred times as sensitive to sucrose (ordinary table sugar) as the human tongue! One frequently sees red admirals

Fig. 8. A sulfur butterfly sipping nectar from a marjoram flower.

Photo: B. J. D. Meeuse

in the Arboretum as early as May (interesting, for in our area this species does not seem to hibernate successfully). Their flight is swift and darting, but the animals will sometimes sit down on humans and horses, undoubtedly attracted by the odor of sweat.

In the Seattle area, I find the red admiral's caterpillars rolled up neatly in a leaf on stinging nettle *(Urtica lyallii),* usually not more than one per plant. Although rather variable in color and pattern, the spiny animals often are black with dazzling white spots on their sides. It is said that the species *(Vanessa atalanta)* was named for this feature, Atalanta being the beautiful nymph who was imprudent enough to beat a Greek goddess in a footrace, thereby gaining a number of silver coins but also the punishment of being changed into a butterfly. In European folklore, *Vanessa atalanta* has also been associated with war, famine and pestilence. The reason is that this species, like its close relative, the painted lady *(Cynthia cardui)* often occurs in huge numbers and will then be responsible for "blood rains" (evil omens!); the fluid which the freshly hatched specimens excrete is blood red! One can easily see what this will do to the landscape when there are enough specimens around. In painted ladies the fluid is more pinkish.

Butterflies can also taste table salt (sodium chloride) in great dilution. Some investigators consider this important in connection with their "puddling" habit — congregating *en masse* around muddy spots in stockyards or on the shoulder of roads and trails. All sorts of butterflies exhibit this behavior, including swallowtails, whites, nymphalids and blues (Lycaenids). This puddling behavior can be observed in the Arboretum also. In tropical countries, whole clouds of butterflies, especially in the family of the whites, may rise from moist riverbanks when disturbed. It is possible that the animals suffer from a constant "hunger" for sodium, an element which higher plants discriminate against so that caterpillars don't have much chance of receiving it with their food. What remains unexplained is why the vast majority of puddling butterflies are males.

Food Preferences of Caterpillars

Butterflies must be good plant taxonomists, for certain butterfly families (or genera within a family) are closely associated with particular plant families. For instance, the various meadowbrowns are grass feeders almost without exception and fritillaries have a close tie with violets. There can be little doubt that in the vast majority of cases the preferences are based on chemical characteristics. Instructive, in this context, is the behavior of some European butterflies of the white family which have a strong tie with plants of the mustard or cabbage family, the Cruciferae. When nasturtiums, which belong to a very different plant family, the Tropaeolaceae, were introduced to Europe from Mexico, these whites were willing to accept them as food plants as well. What do they have in common with the Cruciferae? The presence of mustard oils! Quite probably, the smells that emanate from plants (often in the form of volatile oils, as in citrus or pine trees or in plants of the mint family) induce the females to deposit their eggs on the proper species. In the large swallowtail family, we find some species whose caterpillars are always found on members of Umbelliferae family such as carrot, dill, anise or fennel which have a characteristic fragrance. Other species of swallowtail consistently use pipevines (Aristolochiaceae) as larval food plants. A few butterfly species are restricted to a single food plant; the mistletoe hairstreak, for example, feeds on the dwarf mistletoe *(Arceuthobium)*. At the other end of the spectrum, we find the common painted lady *(Cynthia cardui)* which is extremely catholic in its tastes; its caterpillars have been found on Malvaceae such as hollyhock *(Althaea)* and mallows *(Malva),* Compositae such as thistles *(Cirsium, Carduus*, etc.*)*, artichokes *(Cynara scolymus)* and sagebrush *(Artemisia)*; plants of the nettle family *(Urtica, Boehmeria)*; hops *(Humulus lupulus*, Cannabinaceae*)*; and elms *(Ulmaceae)*. In our own experiments we have transferred painted lady caterpillars, feeding on mallow, to stinging nettles; these were immediately and eagerly accepted, and the caterpillars yielded normal chrysalids and adults! Undoubtedly, the willingness to accept so many different food plants has played an important role in the success of this butterfly. It is found essentially all over the world and will sometimes migrate from one region to another in swarms that are, literally, composed of millions of individuals. The monarch or milkweed-butterfly also has spread to many parts of the world, yet it is much more restricted since it is bound to Asclepiadaceae, which are not found everywhere.

(To be continued.)

A Newly Registered Plant

Pyracantha 'Gold Rush'

JOSEPH A. WITT

Pyracantha 'Gold Rush', a yellow-fruited firethorn, selected in the Arboretum, has recently been registered with Dr. Donald Egolf of the U.S. National Arboretum, the International Registrar for new cultivars of *Pyracantha*.

An interesting story is connected with this new Arboretum introduction. In 1956 we received seeds labeled *Pyracantha angustifolia* which were duly sown and in 1959 four plants were set out in the Arboretum. These seedlings flowered in 1961 and produced fruits that fall; at that time it became apparent that they must be hybrids since two had yellow fruits and two were red-orange fruited. *Pyracantha angustifolia*, the presumed parent, should have had bright yellow-orange berries and narrow gray-green leaves, characteristics missing in the seedlings. The two yellow-fruited plants were attractive enough to make us think they might have some value as ornamentals and these were marked "clone A" and "clone B." Cuttings were made of both and they were planted in several locations for further observation and trial, but no further action was taken with them.

In 1971 the Western Washington Research and Extension Center in Puyallup requested cuttings of several of our pyracanthas to be used in disease resistance trials and "clone A" was included with the others. This was fortunate, because the original seedlings were cut to the ground in the bitter winter of 1971-72, and while several of their cuttings were only slightly damaged, none were growing as vigorously as the parent.

During the next three years other issues were our main concern and no thought was given to these selections. This quiescent period ended abruptly when Dr. Charles Gould, pathologist at the experiment station, called to ask if we were going to name and distribute "clone A." Dr. Gould, Dr. George Ryan, horticulturist for the center, and Mr. Worth Vasey had assembled a very comprehensive collection of firethorns primarily to test for resistance to scab, but also to evaluate for ornamental use in the Northwest. At a field day for western Washington nurserymen which they had had some few days earlier they had received many inquiries about "clone A": What was it? Where could they buy it? and similar questions. Both Dr. Gould and Dr. Ryan felt the plant should be named and distributed as soon as possible especially since it seemed to be resistant to scab, a serious local problem with many pyracantha species and cultivars.

A trip to the field trials in Puyallup on a dark and rainy day in October last year confirmed their opinion: The plants of "clone A" were growing among long rows of other pyracanthas and were heavily loaded with large clusters of golden-orange fruits, an outstanding and sunny display on such a dark day.

It seemed appropriate to name and introduce this plant since truly good golden fruited forms of *Pyracantha* are not that common. A brief description of the new cultivar follows:

> *Pyracantha* 'Gold Rush'. A putative hybrid of *P. angustifolia* and *P. fortuniana* raised from seed at the University of Washington Arboretum. In habit, a spreading intricately branched shrub perhaps ten feet tall and as much across with persistent leaves 1 to 2½ inches long and ½ inch broad, shining green above, paler beneath. Fruits carried in dense clusters along stems, flattened globose nearly ½ inch broad, orange yellow (R.H.A. colour chart 17B) coloring early in September and persisting into early winter. Probably hardy to Zone 7.

1853, March 20. On the warm, dry cliff, looking south over Beaver Pond, I was surprised to see a large butterfly, black with buff-edged wings, so tender a creature to be out so early, and, when alighted, opening and shutting its wings. What does it do these frosty nights? Its chrysalis must have hung in some sunny nook of the rocks. Born to be food for some early bird.

Henry David Thoreau's *Journals*

FROM A COLLECTOR'S NOTEBOOK

BRIAN O. MULLIGAN

Photo: B. O. Mulligan

1. *Salix lanata* — The Woolly Willow

Given by Linnaeus in 1753 the specific name to this native shrub of his own country, Sweden, was certainly well chosen, since almost all parts of the plant are covered with a gray wool or with silky hairs, giving the whole a silver gray or grey-green sheen, especially in spring and early summer when the flowers and young foliage are developing. The mature leaves are 2 inches or more long, heart-shaped at the base, abruptly pointed, persistently silky hairy beneath and with a conspicuous pair of stipules covering the petiole.

Just such a mature old plant was seen in a garden near Enniskillen, Co. Fermanagh, Northern Ireland, in early June, 1975, when the short, upright male inflorescences were well developed. This plant was growing on the bank of an ornamental lake and was approximately four feet tall by seven to eight feet in width — an exceptionally fine example of its kind, probably sixty or more years old since it had been planted by the father of the present owner. Even small plants, however, show their typical characteristics at an early age and anyone acquiring and planting one (if obtainable in this country!) will certainly enjoy its annual sequence of leafing and flowering.

Salix lanata is found wild in northern Europe from Iceland through central Scotland to northern Russia, then across it to the region about the Lena River (Yakutskaya). A subspecies, *richardsonii*, is common in Alaska and arctic Canada, but apparently lacks the silky hairiness of the foliage which is so conspicuous a feature of the typical plant, although catkins may be larger. A hybrid, *S.* x *balfourii*, between the European goat willow *(S. caprea)* and *S. lanata*, is now established in the Arboretum, but its qualities and value have yet to be determined.

2. *Dipelta floribunda*

Dipelta is a small genus of only four species, all native in China, allied to *Abelia* and *Kolkwitzia* from the same country but distinguished from

Photo: B. O. Mulligan

them by the possession of two large shield-shaped bracts attached at their centers to the paired fruits. These provided the Greek origin of the apt generic name given by Carl J. Maximowicz in 1877, almost a century ago.

This shrub had been discovered in central or western China two years previously but, like *Buddleia alternifolia* and *Viburnum farreri (fragrans)* from north China, was not introduced until many years later. In this case, E. H. Wilson sent living plants to England, in 1902, followed two years later by seeds. By 1910 it had become large enough to be illustrated in the *Botanical Magazine* (vol. CXXXVI, t.8310), together with another species of *Dipelta* also found and introduced by Wilson from western China in 1904, *D. ventricosa* (t.8294) which has a cylindrical instead of a funnel-shaped corolla.

D. floribunda grows into a large shrub twelve to fifteen feet or even more in height and seems to enjoy a calcareous soil. The leaves are much like those of some species of *Weigela*, ovate-lanceolate, three - four inches long, not toothed, paler on the underside. The flowers are fragrant, produced in small racemes at the ends of short lateral branches from mid-May onward into June. They are funnel-shaped, larger than those of *Kolkwitzia amabilis*, up to one and one quarter inches in length, pale pink at first becoming nearly white as they age and with a conspicuous orange blotch in the throat, like *Kolkwitzia*.

A specimen can be seen on the west side of Azalea Way in the Arboretum just south of Loderi Valley. This was received as a small plant from the Arnold Arboretum in 1952 and planted in April 1957. It has been flowering regularly since at least 1961 and is interesting and decorative again in late summer and early fall for the developing fruits with their conspicuous pale green, pink-tinged bracts. It is most regrettable that this fine shrub has not been propagated by nurserymen as freely as has *Kolkwitzia*, the so-called Beauty Bush, since it has undoubted good qualities and value from spring to fall. Propagation by cuttings in summer under mist would be the recommended method to achieve quick results.

The photograph was taken in the famous garden at Mount Usher, Co. Wicklow, Ireland, on May 23, 1975.

Photo: B. O. Mulligan

3. *Paeonia broteroi*

In early May, 1975 we visited my former professor, Lawrence Ogilvie, whose home is situated on the limestone hills a few miles south of the city of Bristol, England. We were much attracted by a very handsome peony then in full bloom in several places in his garden. The plant possessed very deeply divided and quite sharply pointed leaves, gray on the underside, with the flowers standing up well above them to a height of about two feet, each soft rose-pink, bowl-shaped bloom about five inches wide had a mass of yellow stamens in the center surrounding the densely pubescent ovary.

At that time neither we nor our hosts were able to identify it, but after seeing the collection of peony species flowering at the Royal Botanic Gardens, Kew, about ten days later it seemed to resemble *P. coriacea* from southern Spain and Morocco (in the Atlas Mountains). The latter, however, has red filaments to the stamens and a glabrous ovary.

On returning to Seattle and further checking our photographs of the plant with F. C. Stern's "A Study of the Genus Paeonia" (Royal Horticultural Society, London, 1946), we believe this plant to be *P. broteroi*, native to Portugal and central and southern Spain, where it occurs by the road from Ronda to Granada and between Granada and Cordova, growing under cork oak trees and usually on limestone soils. As Professor Ogilvie and his wife had visited this region in past years, it is highly probable that seeds were brought back and were the source of the plants which we so admired. It is certainly a very handsome herbaceous species, as also is *P. coriacea*, and either of them would be well worth growing here if the opportunity occurred to obtain seeds or plants.

The greenhouse viewed from a corner of the nursery, the lathhouse center right. The roof of the office can be seen above the roof line of the greenhouse. Note car and people for scale. Photo: J. P. Butler

A New Garden for the Pacific Northwest:
A Rhododendron Species Garden

*DORIS BUTLER**

Perhaps few plant genera offer the diversity of form and color that is to be found in the collection of plants known as rhododendron species. They provide something for everyone! For the armchair enthusiast accounts abound with the romance of travel, expeditions and daring physical feats of professional and avocational plant hunters who risked their lives, and in some cases, *gave* their lives to find and bring into cultivation new species of rhododendron for our gardens. In fact, growing rhododendrons can be an adventure in itself!

Almost 1000 distinct species of rhododendrons are known. In this vast group one can find diversity of plant size (from epiphytes to giant trees to tiny mat-like ground covers), diversity of individual leaf size and appearance (from three feet to a quarter of an inch long, from densely scaled blue-green glaucous leaves to those with bristly hairs and buff, rust or silvery grey heavy indumentum on upper and/or lower leaf surfaces, or shiny, coppery new growth), diversity of inflorescence (from tiny daphne-like blossoms to gently nodding bells, from fire-cracker colored and shaped blooms to magnificent trusses comprised of many individual florets six or more inches across), and diversity of color (whites, yellows, pinks, reds, blues, purple, lavender or combinations of colors). David Leach in his definitive book *Rhododendrons of the World* has called this the "most varied and unwieldy group of plants that exist on this earth."

Because of this diversity of form rhododendrons have acquired an unprecedented popularity in recent years. Hybrids have been the starting point for most enthusiasts, but as the interest in and the demand for species grew, a new kind of diversity became apparent: Within a species many different forms of that species were being grown, some superior and many grossly inferior to the type.

An exciting program aimed at preserving, propagating and distributing the finest forms of

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*Credit for this article is given to Fred Robbins, President of the Species Foundation, P. H. Brydon, Secretary, and Corydon Wagner, all of whom contributed time, knowledge and encouragement.

rhododendron species is under way in a charming woodland setting adjacent to the Weyerhaueser Corporation Headquarters at Federal Way near Tacoma. Instituted by a duly incorporated non-profit organization known as the Rhododendron Species Foundation, the project began approximately twelve years ago, initially near Eugene, Oregon and later some 80 miles to the north at Salem, Oregon.

Knowledgeable and dedicated members of the American Rhododendron Society soon recognized the problem of inferior forms being propagated and foisted off on an unwary and unknowing public. They also realized that some of the great gardens of England and Scotland, because of economical and financial pressures, were gradually reducing their collections of rhododendrons. A serious threat existed that many fine forms were in danger of being lost to cultivation. The ARS was greatly concerned by both situations.

They appointed Dr. Milton Walker of Eugene to study these problems and to check the true species of rhododendrons. As a member of a select committee he worked for three years, traveling several times at his own expense to England and Scotland to visit famous gardens where known superior forms of rhododendron species were being grown. At the end of that period, a recommendation was made to the ARS that a collection of good species be established and maintained. Because the American Rhododendron Society's Board was a constantly changing unit, it was deemed advisable to create a new entity which would have greater stability. The Rhododendron Species Foundation was born.

Its objects and purposes as stated in the By-Laws are "to promote educational and scientific research in the field of horticulture, primarily species rhododendrons. The activities will include the study of species rhododendrons, the location, selection, propagation of the very best forms and to make said knowledge and selected forms available to all persons interested in the culture of species rhododendrons. . . . and, among other things, may include establishment, maintenance and operation of garden or gardens and other facilities for the propagation and growing of species rhododendrons and companion trees, shrubs and plants."

Dr. Walker's efforts and contacts in England resulted in the generous response of garden owners there and elsewhere sharing the treasures of their gardens. Scions of superior plant forms were flown from England and Scotland to the University of British Columbia Botanical Gardens in Vancouver and grown there before being sent on to the rhododendron species garden being established in Eugene.

When Dr. Walker could no longer continue his active role in the development of the species garden, some 2000 plants were dug and moved in May, 1971 to the Salem home of P. H. Brydon, who had recently retired as Director of Strybing Arboretum in San Francisco. The collection under Mr. Brydon's care continued to grow rapidly both in the size of the material itself and in regard to the acquisition of new plants. Accessions soon numbered over 600, and consisted of 330 species, 10 sub-species, 40 species varieties and 220 clonal forms.

It also became readily apparent that this collection was becoming too valuable and that the physical work involved in maintaining and adding to it was too great to be born solely by the Brydons. The Foundation began to look for other means to continue the project.

In 1973 an event unprecedented in the annals of American horticulture occurred which brought new vitality and hope to the small group of Species Foundation members who had carried the financial and physical burden since the inception of the idea. The Weyerhaeuser Corporation agreed to loan to the Foundation 23 acres of land adjacent to their headquarters buildings. A basic part of the agreement was the arrangement for initial development of the property: Weyerhaeuser was to provide the funding to clear, grade and contour the area, to add the necessary enrichments to the soil in the form of sawdust and nitrogen, to build foot paths and service roads, to fence the entire area for protection and to build the necessary structural requirements for propagating and maintaining the collection. In short, the cost of the entire preparation of the 23 acres for a garden facility was to be provided by the Weyerhaeuser Corporation. In addition, after site preparation is completed and the area turned over to the Rhododendron Species Foundation for development and maintenance of the garden, Weyerhaeuser would continue to furnish

electricity, water and upkeep of the roads.

Preparation of the site involved many things. Careful consideration was given to contour of the land so that the garden would have environmental variations dependent upon different exposures of light, wind, altitude and temperature. Within the proposed garden were varying soil and drainage situations as well.

The soil in the twenty-three acre garden is primarily glacial silt. The top soil appears to be good, though drainage problems in some areas required special attention. For example, the soil in the nursery area was a waterproof clay and plants were found to be sitting in water. It became necessary to build up the beds and add ten inches of good soil and at the same time, to provide drainage ditches to remove the water.

Initial preparation involved removal of blackberry vines and underbrush with natural settings retained as much as possible. Salal, ferns, Oregon grape, trilliums, native ground covers, huckleberry, dogwood, and madrona were retained when possible. Second growth fir, hemlock and cedar on the property were also saved, while rocks, rotten logs and windfalls were carefully kept to add to the natural woodland setting. With the removal of much undergrowth allowing circulation of air and penetration of light, the remaining trees began to respond and now form the background of protection and aesthetic appeal for the garden.

A perimeter road and the necessary service roads were installed. A 10-foot chain-link fence surrounds the entire garden. Plans are to make the fence inobtrusive by planting material adjacent to it to fit the woodland setting. Cedar and redwood split rail gates provide entry to the property. Footpaths will allow visitors to enjoy the garden at leisure.

In addition to a special nursery area, Weyerhaeuser provided the funding for three major structures to be built to the specifications of knowledgeable leaders within the Species Foundation. Adjacent to the nursery area are a building housing the office and providing tool and equipment storage, a specially planned greenhouse, and a large lathhouse for conditioning cuttings before they are set out in the garden.

Of the three buildings, each of significance to the program, perhaps most impressive is the greenhouse. Much planning went into its construction, resulting in a superb facility for propagating species. Six long benches provide room for cuttings. One bench is equipped with 100% humidity to facilitate grafting. Some material is difficult to root, though the goal is to obtain all plants from cuttings. Three mist systems are controlled by timers, as are lights, heat and humidity controls. The elaborate switch board has controls for each bench, for heaters, blowers and for the pad pump and damper at the opposite end of the greenhouse.

A view of the area before site preparation began. Photo: P. H. Brydon

This facility will enable the Foundation to raise between twelve and fifteen thousand cuttings a year of the finest forms extant today. Surplus plants are presently being offered at cost of production to Foundation members who have donated $100.00 or more. As stock enlarges plants will be made available also at cost to the entire membership of the Foundation, to members of Rhododendron Society chapters and to the trade.

As impressive and important as the preliminary work funded by the Weyerhaeuser Corporation is, the most important part of the garden development is presently beginning. The collection of plants formerly grown in Eugene and Salem have been maintained in the nursery area. Others have been added. There are now over 350 species, combining 300 clonal forms and 40 varieties for a total of some 10,000 plants. Over 6,000 plants, some 2-4 feet, others 4-5 feet, are ready to be planted. Additional material is being propagated and will become a part of the garden as size and conditions permit.

The nitrogen-enriched sawdust spread on the entire acreage has sufficiently decomposed to permit planting to begin. Much planning and coordination has preceded this activity, with members of the Board responding to questionnaires regarding the proposed arrangements of plants. The curators of such gardens as Windsor Great Park and Kew in England and the Royal Botanic Garden in Edinborough and other knowledgeable horticulturists and botanists have been consulted. Study groups have submitted their ideas. All are agreed that the Species Foundation has an unprecedented opportunity to create an outstanding garden, perhaps the finest of its kind anywhere in the world. The arrangement of plants, however, has not had the unanimity of opinion.

Many possibilities have been discussed. Arrangements of plants by series and sub-series has obvious merit for the hard-core rhododendron buff, the botanist and geneticist. Plantings which indicate geographical origins of individual rhododendrons and the evolutionary development of the species have also been considered. Many have felt that the individual plants were the most important item and that the garden should be planted so that prime consideration is the horticultural and environmental well-being of the material, itself.

Although final approval has yet to be given by the board, the geographical arrangement concept appears to be the direction the future planting will take. As devised by Mr. Brydon, the plan allows 15 acres for planting rhododendrons and companion plants. (Approximately 4 acres have been utilized for greenhouse, lathhouse, nursery and an adjacent area yet unsuitable for planting. It is estimated that another 4 acres have been used for windbreaks, roads, paths and natural cover.)

After initial clearing and roads were installed. Note the piles of enriched sawdust ready to be spread. Photo: P. H. Brydon

Within the 15 acres, eight planting groups are suggested, seven to geographical areas and one to a Student's Garden.

Hopefully approximately 450 species can be grown out of doors in the new garden. Since various geographical forms and cultivars of the species will be included, the plan provides for 5 forms per species and 3 plants of each form. Though ultimate space requirements of individual species differ, an average of 60 square feet per adult plant has been allotted in the plan presently being considered.

Suggested apportionment of species and the numbers of species presently on hand follows:

GEOGRAPHICAL AREA	NO. OF SPECIES	NO. SPECIES ON HAND	ASSIGNED SPACE
China	250	171	5.6 acres
Tibet	63	43	1.25 acres
Nepal, Sikkim, Assam, Himalaya, Bhutan	46	35	1.00 acres
Burma	22	16	.50 acres
Japan, Korea, Formosa	42	34	1.00 acres
North America	24	12	.50 acres
Europe, Caucasus, etc.	10	7	.25 acres
Student's Garden (75 species and sub-species)			1.00 acres
		Total Net	11.60 acres

The Student's Garden will be primarily a demonstration garden with representatives of the 75 series and sub-series preferably arranged to show their phylogenetic relationship. It will be useful for study-group purposes, but will also benefit the individual visitor to the garden who wishes to identify, compare or learn more about the genus.

The proposed plan utilizes the remaining 3.40 acres for natural companion plants — trees, shrubs and ground covers — which preferably are indigenous to the same geographic area as the rhododendrons with which they will be planted. Being planted now are young trees of *Acer ginnala, A. griseum, A. grosseri, A. nikoense, A. palmatum dissectum, A.p.d.* 'Ornatum,' *Amelanchier* 'Saskatoon Berry,' *Cercidiphyllum japonicum, Cornus x* 'Eddie's Wonder,' *C. kousa, C. mas, Enkianthus companulatus, Fothergilla monticola, Hamamellis mollis, H. intermedia* 'Jelena,' *Magnolia kobus, Stewartia monodelpha, S. pseudocamellia,* and *Styrax obassia*. Other material is included in future plans.

Future plans also include construction of a glasshouse and a cold house, enabling the Foundation to grow the exciting Malesian species and other tender species such as some of the Maddenii series which would not survive in our climate without special consideration. These plans, however, will await the completion of the present garden.

What is important about the garden is that here will be room for only the top forms. Every form planted will be an AM (Award of Merit) form earned against competition, or a top form from private and public gardens of the British Isles, Japan, America or elsewhere, or that obtained from today's plant hunters, for some feel that many species remain to be discovered. Each plant will typify the finest form available. All will be forms recognized as authentic species; all will have been keyed or identified by authorities.

Important also is the fact that this is a Species Foundation garden. It will, therefore, have unanimity of direction and a singleness of purpose as well as an international outlook. The garden will be developed and maintained by the Species Foundation with total control being provided by the officers and board of that organization. To date costs have been born by a small group. The collection now has a permanent home and the garden is rapidly becoming an observable entity. Currently the Foundation assumes responsibility for all costs of future development and maintenance. It must be self-sufficient and self-supporting. A broad base of memberships in the Foundation would help to insure the necessary funds for the garden. All memberships, gifts and endowments are welcomed and are tax deductible.

Members will be allowed the privilege of obtaining superior forms of plant material at cost,

(Continued on p. 19)

Interior view of greenhouse. Photo: J. P. Butler

Plants in the lathhouse will be set out in the garden as conditions permit. Photo: J. P. Butler

New Garden (continued from p. 16)

as well as access to the garden for study purposes or for enjoyment. The garden will be open to the public on specific days. Guides or docents, study group members or other knowledgeable people, will be available to take small groups through the garden. All plants will be properly labelled with pertinent educational information.

What an exciting concept this garden is and how fortunate we in the Northwest are to have it at our doorstep! Nothing like it exists anywhere in the world. With the gradual demise of famous gardens elsewhere for tax reasons, this garden can assume even greater future importance, for it will be a repository of the best forms available anywhere — a living museum.

As the garden matures and receives world-wide recognition, the proximity to an international airport adds another dimension to its value as a garden and to the opportunities for service. Plants from any area of the globe can be dug, transported by air, and replanted in the garden within a twenty-four hour period. As trade with China, Indo-China and the Far East is re-established, new species discovered can be brought to the garden for study, propagation and dissemination. Scientists, botanists and experts, whomever they may be and wherever they may be, can be flown to the garden to view and check new and existing material. The garden can become the Mecca — the place in the future where rhododendron species can be seen, studied and authenticated

People of the Pacific Northwest can feel pride in this innovative undertaking. They can be participants by lending their support as members of the Foundation. The garden's potential is great. It will be an outstanding contribution to the horticultural life of the Northwest, and obviously, as it matures, it will become an item high on the list of tourist attractions in our area.

Many plants in the nursery are blooming size. These are all ready to be planted in the garden. Photo: J. P. Butler

BOTANICAL GARDENS IN THE BICENTENNIAL: REVIEW AND PROSPECT

*HOWARD S. IRWIN**

It is fitting, in this bicentennial year, to review briefly the history and achievements of botanical gardens in the United States and to consider what may be their most appropriate roles in the future.

Botanical gardens originated in Europe. In 1543, Professor Luca Ghini at the University of Pisa, following the lead of Aristotle, and of Theophrastus 800 years before, realized that the best way to acquaint his medical students with the wealth of plant life in the surrounding fields and forests was to assemble living samples of the flora in a systematic garden at the university. In a few years, similar gardens were begun elsewhere in Italy. The idea quickly spread to Spain, Portugal, and France, not only to familiarize students with the local flora but to display the botanical treasures being brought back from explorations of Africa, America, and the Orient. Incorporating newly discovered exotic plants into landscape design became a European horticultural preoccupation in itself.

America's first botanical garden was John Bartram's Garden, founded in 1728 in Philadelphia, followed by Andre Michaux's Garden in 1787 near Charleston, S.C., and David Hosack's Elgin Garden in 1801 on the present site of Rockefeller Center in New York City. Although it eventually gave way to concrete and steel, the Elgin Garden was the direct predecessor of the New York Botanical Garden, established ninety years later by Columbia University botany professor, Nathaniel Lord Britton.

Botanical gardens in the United States have varied somewhat in scope, but in the main they have brought together in pleasing settings large collections of hardy and tender trees, shrubs, and smaller plants so that people might learn their names and characteristics. Botanical gardens have served as testing grounds for the introduction of plant species new to the region and as exhibitors of newly developed strains not yet in the horticultural trade. The larger gardens have served as research centers focusing on plant diversity and concentrating on such fields as taxonomy, ecology, pathology, and genetics. Most gardens have become important plant information centers, and some have assembled large herbaria and libraries. Some few have become training centers for professional botanists, horticulturists, and gardeners. Three or four have become major centers of botanical and horticultural publishing.

Today, in the context of the great array of problems arising from man's misperception of his role in the world ecosystem, the challenges before botanical gardens are immense.

Promoting the concept of the unity of nature, slowing the pace of species extinctions, and raising the public consciousness of the importance of plants are broad cultural goals. Maintaining stocks of potential food plants, breeding and selecting plants with special suitabilities for man-dominated urban environments, salvaging species otherwise doomed to extinction, continuing the world inventory of plants and reinterpreting the processes that have led to today's plant panorama, and demonstrating the beauty that plants can bring to diverse human settings, are continuations or extensions or present directions.

Recent advances in genetic manipulation and plant biochemistry lead to a host of additional possibilities, such as deliberately "engineering" plants for specific uses, limiting the fertility of introduced exotic species (some of which get seriously out of hand in alien settings), controling alien disease organisms that threaten native plant species (chestnut blight, Dutch elm disease, gypsy moth, etc.) with biological agents, promoting the greater use of suitable native spe-

(Continued on p. 28)

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*Dr. Irwin is President of the New York Botanical Garden, Bronx, New York. This article is reprinted with his permission from the *Garden Journal,* 26/1, February, 1976.

RHODODI

PLANTS O
BACKGROUNDS AND

Lawrence Pierce

R. spinuliferum, China; brick-red flowers about 1 in. long; leaves 3 in. long and 1½ in. wide.

R. pseudochrysanthum, Formosa, compact s
long and 1½ in. broad, wooly indumentum w

R. falconeri, Sikkim; tree to 50 ft, reddish flaking bark; flowers white to yellow with purple blotch, many to a truss, each 2½ in. long and 1-2 in. across; leaves 12 in. or more long, 6 in. wide, new foliage covered with rust-colored indumentum.

Cecil Smith

R. macabeanum, Nepal, tree to 45 ft,; yellow
broad.

NDRONS:

DIVERSE CHARACTERISTICS

Mae Granston

R. trichostomum, China; daphne-like rose or white flowers, ¾ in. long, many to a truss; leaves 1⅓ in. long.

Mae Granston

…o; flowers rose-pink, 2 in. long; leaves 3 in. …young.

R. edgeworthii, Bhutan, to 10 ft., often straggling branchlets tomentose; flowers white, 4 in. long and wide, fragrant; leaves 4 in. long, 2 in. broad, dark green bullate above and tomentose below. Tender here.

Brian O. Mulligan

…ers to 3 in. long; leaves to 12 in. long and 6 in.

Lawrence Pierce

National Counsel for Therapy and Rehabilitation through Horticulture**

*MAGGIE OSTER**

In 1973, the National Council for Therapy and Rehabilitation through Horticulture (NCTRH) was established with the purpose of promoting and encouraging "the development of horticulture and related activities as a therapeutic and rehabilitative medium."

The formation of the council is, in a sense, the culmination of gardening being used for centuries as a preventative and curative "medicine." Before psychiatry was considered a science, garden work was prescribed for the ills of the mind and nervous system. Records exist of doctors in the late 1700's and 1800's — from Spain to Scotland to the United States — utilizing gardening as a therapeutic tool. The advent of the 20th century saw ever-increasing usage.

Today, many psychiatric hospitals, senior citizen homes, inner city youth programs, correctional institutions, schools for the mentally retarded and physically handicapped are using horticulture for educational, therapeutic and recreational purposes.

> Use of horticulture as training, career opportunity, and therapy for the handicapped is on the increase. The success so far has been great. The present trend must continue so that more handicapped are given the opportunity to achieve their career potentials through horticultural training.
>
> Earl Copus Jr.
> *Landscape for Living, 1972*
> U.S. Dept. of Agriculture
> Yearbook

Prior to 1973, though many people throughout this country used horticulture for therapy, there existed a feeling of "aloneness," no sense of the profession as a whole and no chance to interact with other people doing the same type of work. The formation of the council has changed all this.

Now a bi-monthly newsletter publishes information on individual programs; a bi-monthly lecture and publication series provides excerpts from talks and articles otherwise not available to most members, and an annual conference brings members and other interested people together to discuss their work and take part in comprehensive programs.

In addition, the council has set up a placement service and manpower bank. The council assists in the planning and promotion of regional workshops which updates and upgrades therapists' skills and it has been active in forming regional or state chapters. At the present time, two chapters have affiliated with the council: Ohio and Kansas. Chapters are preparing for affiliation in Pennsylvania, Maryland and California.

The council is working with universities in the development of curriculums for students interested in becoming horticultural therapists. And, perhaps most important of all, the council is in the process of establishing standards and designing a program of certification and registration of professionals. This is a necessary step not only in assuring the continuation of a profession, but in maintaining its validity.

Thus horticulture has a unique opportunity in therapeutic, rehabilitative and preventive medicine, i.e., in helping people achieve a better understanding of themselves and the world around them. And the formation of the NCTRH will enable the trend of horticultural therapy to grow and flourish as it brings more and more people interested in horticultural therapy together and provides them with a forum for the exchange of ideas.

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*Ms. Oster, Managing Editor of *Plants Alive,* is a member of the National Council for Therapy and Rehabilitation through Horticulture.

**This article and the two following illustrate Northwest citizen involvement in people-plant interactions as expressed by Charles A. Lewis in his article in the previous issue.

Photo: Jean Henderson

Seven-year old Jody Brown, Fairbanks, Alaska, pots a plant for her room at the Children's Orthopedic Hospital in Seattle.

PLANTS ARE THERAPY

Jean Henderson

When volunteers from The Arboretum Foundation's Unit Council make one of their monthly visits to a hospital or nursing home, they take more than just plants.

Although they come armed with plants or bulbs or seeds, potting soil, containers and water bottles, the volunteers have discovered that these ingredients add up to more than just a fun afternoon.

"It's so satisfying to be doing this program," says Cora Gardiner, chairperson of the Hospital and School Program. "I love working with plants so much myself that to be able to help others enjoy them is a great deal of fun."

Mrs. Gardiner, Vera Frazier (her assistant), and other volunteers regularly visit Children's Orthopedic Hospital and Medical Center and the pediatric ward at Group Health Hospital. They also go monthly to Arden Nursing Home.

These programs have grown out of the Council's School Program initiated in 1969. In the elementary classrooms the women find their visits are an educational stimulus to lessons in botany and biology. In the newer programs, however, they've found the plants are therapeutic.

"I remember one boy about a year old who had so much fun at Group Health Hospital," says Mrs. Gardiner. "He was engrossed for an awfully long time . . . just playing with the soil."

She also recalls a teenager at Children's Hospital who knew the technical names of most of the plants.

"Naming the plants gave him a chance to shine," she states.

Meg Penalver, new recreational therapist at that hospital, agrees that the planting and playing in the soil is good for the children.

"Working with plants seems to have a special meaning for these kids. I think it is because it gives them a chance to do something with another living thing. You'd be surprised how many children, little ones, have and still care for the plants they potted months ago."

She adds, "One little girl was so proud of her planting. She told everyone, 'I did it with my hands and it's alive.' "

At Arden Nursing Home where the program just began in February 1976, results of a similar nature are reported by Charlotte Sanborn, registered occupational therapist.

She recalls one woman who had isolated herself, refusing to visit with anyone. The staff brought her to the activities the day the "Arboretum ladies" came.

"She had a wonderful reaction to it," Mrs. Sanborn states, "and ever since she has been calling people into her room to talk about her plant and see how it is doing."

Most residents of the home did gardening as a hobby at one time, Mrs. Sanborn notes. Some even won prizes for their flowers and to others gardening was their life.

"So working with plants is familiar to them and this gives them something to look forward to," she says. "They can watch the potted plants grow and something growing just seems to bring a different worth into their lives.

"You know, just getting your hands into soil brings something to life that you can get in no other way."

John Motto (left) and Elmer Diebler, residents at the Arden Nursing Home, concentrate on potting plants to brighten their environment.

Photo: Jean Henderson

PORTLAND TREE PROGRAM

The City of Portland street tree program is in its infant stage at this time. Our program is approximately 3 years old, and we have planted some 5,000 trees.

Our contact with the public works through radio stations, news media, neighborhood associations, and the public school systems.

Our initial contacts with the schools were in areas considered economically depressed. A Park Bureau representative visited the schools during assembly meetings and explained to the children what the Park Bureau planned to do with street and school ground tree plantings.

The entire student bodies were released on the afternoons of the initial planting dates. Students would assist in planting two or three trees. A brief explanation of the trees' growth process would be given: watering, the necessity for staking the trees, etc. Some members of the City Council would be present and also assist in the first plantings.

Within the city limits there exist neighborhood organizations, some 40 or more, who meet with representatives from various city bureaus to discuss civic problems. The Park Bureau also meets with these organizations prior to any planning for street tree plantings. We stress the major problems of these planting programs attempting to get them directly involved in watering and helping to prevent vandalism.

The vandalism that occurred in tree-planted areas where the people were not involved (even in districts of higher-income levels) was considerably higher than where people participation took place.

However, vandalism remains our number one problem. We are buying and planting as large a size tree as is available and practical.

We are establishing our own nursery to help guarantee availability of varieties and sizes to be able to project our future planting programs.

Ervin M. Thoreson
Landscape Architect
Bureau of Parks and Public Recreation
City of Portland
Portland, Oregon

A fallen flower

Returning

To the branch?

It was a butterfly.

Moritake

U. of W. Arboretum Classes

Arboretum courses are scheduled by the College of Forest Resources. No classes will be held during the summer. Fall and winter classes will be listed in *Spectrum,* which appears 4 times a year and will be mailed free of charge to those on the Continuing Education mailing list. To place your name on this list call 543-2590. Response to classes has been great and early registration is advised. Registration blanks are available in *Spectrum.* Checks should be made payable to the University of Washington and sent to Arboretum Courses, Anderson Hall (AR-10), U. of W. Seattle, 98195.

Notes and Comments

This issue of the *Bulletin* represents the last issue under the present editorship. Beginning with the next issue Mrs. Giacoma Pirzio-Biroli will become the Editor. We take this opportunity to thank all who participated by sharing knowledge and experience, as well as those who have provided manuscripts. The Arboretum staff, the editorial board, and members and friends of the Foundation and the Arboretum have all helped make a more thought-provoking *Bulletin* . We urge your continued support in helping to create an evermore useful and informative publication.

We also thank the many *Bulletin* readers who took time to complete and return the questionaire sent out with the last issue. Your comments and suggestions will be helpful to the editorial board. If you have not returned your questionaire, the board would be pleased to hear from you.

Lisa Shawver has joined our staff as copyeditor and production person. Lisa has a good background of training and experience and we welcome her participation.

All new members are important, but a particular welcome goes to 8-year-old Malena Talbott of Woodinville, Washington, who saved gift money for a special purpose: to join the Arboretum Foundation at the recent plant sale! We agree with Malena that one cannot begin too early to recognize the importance of plants in our environment and to experience the enrichment that knowledge of plants can bring to our lives.

This is your Arboretum kept alive by your support

We are pleased to welcome the following new members (February 1, 1976 through April 30, 1976):

Contributing — James R. Kunz. *Sustaining* — Miss Patricia A. Gutter, Mr. & Mrs. L. O. Hurst, Mrs, George Morikawa, Mr. & Mrs. Lothar Pinkers, James L. Pullen, Mrs. Eugene L. Reinhart, Mrs. Thomas Temple, Peter A. Wharton. *Annual* — Mrs. Richard Anderson, Mrs. Thomas R. Anderson, Audubon Arboretum Club (Elementary class sponsored by teacher), Mrs. Grant Barker, Mrs. Robert Blumenthal, Mrs. James Borland, Mrs. William Boules, Mr. Gerald Burnett, Mrs. J. H. Craft, Mrs. Chalmer Cook, Mrs. C. R. Corjel, Mrs. Frederick Crimp, Miss Melinda Denton, Dr. Dan Empenger, Mrs. James Erickson, Mrs. Joseph Dunn, Mrs. James Glass, Mrs. Frederick J. Hansen, Mrs. James A. Harris, Mrs. Robert Hawes, Mrs. Frank Hawkins, Mrs. William Hubbock, J. M. Hudson, Mr. & Mrs. J. E. Huffman, Stephen Inman, Mrs. Theodor S. Jacobsen, Mrs. Richard Joy, Bonnie Kirkpatrick, Robert H. Kizer, Mrs. John L. Kleeb, Patricia S. Lantow, Mrs. Roger Livingston, Mrs. Theodore R. Marston, Mrs. Randolph Miller, Mrs. Paul Oberg, Mrs. Terry Orell, Melville E. Osborne, Mrs. Hewey Petrich, Mrs. Darryl Rogers, Mrs. John Schnaidt, Mrs. Robert Schneider, Mrs. D. W. Shirley, Jr., Mrs. Dorothy M. Singletary, Mrs. Frank A. Spaciacotelli, Joanne A. Stauffer, Mrs. Mark L. Wyatt

A special welcome to those also joined on our Plant Sale days, May 5th & 6th. Many interested persons took envelopes and are joining through the month of May. They will be listed in the Bulletin Report of the Summer issue. The following became members on May 5th and 6th: *Contributing* — Dr. & Mrs. David P. Derleth, Mrs. Dennis E. King. *Sustaining* — Mrs. Mary Booth, Russell Hamilton, Mrs. Karl H. Joplin, Mrs. Herbert Lindahl, Mrs. Richard McGee, Roger Sauer, Mrs. Murray Shiff, Gary Shirley, Mr. & Mrs. Chester S. Soley, Mrs. John W. Ward and Karen Young. *Annual* — Philip J. Aaron, Paul A. Bianchi, Mrs. Bud J. Burnett, Miss Marie Churney, Mrs. Richard Corlett, Mrs. Rosemary Cruea, Mrs. Jane Erickson, Miss Mimi Everett, Harold Fellows, Mrs. Aubrey Horn, Mrs. Mary Jo Koenemann, Mrs. Janet Lewis, Mrs. Jo Murgulo, Mrs. Glenn Riehl, Mrs. Dorothea Ritchie, Jean Stewart, Sue Stice, Miss Malena Talbott, Mrs. Soo Wright.

We are also grateful to the following who have increased their dues to: *Contributing* — Mrs. Joseph P. Butler, Mrs. Robert M. Helsell. *Sustaining* — Mrs. E. E. Brighton, Mrs. William W. Cooley, Peter M. Harvard, Mrs. Chauncey Hazen, Edward M. Lewis, Mrs. James Russell.

Our Crops: Their Ethnic Roots

*BLANCHE B. DEARBORN**

Our annual harvest is awesome in its variety and complexity. The long journey back to its origin is a fascinating one, and this year, 1976, is particularly appropriate for a backward glance at the early years of experimentation and importation.

Since the United States has only one-fourth of the edible plant resources of Europe and not more than one-tenth of those in Asia, the early settlers found their search for food to be somewhat unrewarding. In the beginning, settlers considered, among crops cultivated by the Indians, only corn and potatoes edible. Later, plant explorers would "discover" other plants of food value. Still, of our 78 leading crops in the United States, approximately 10 are native; the rest were brought across the Atlantic as "green cargo" — the familiar foods of the Old World.

Before actual colonization took place, many early explorers introduced European plants to the New World. For instance, records of French navigator and discoverer of the St. Lawrence River, Jacques Cartier, reveal that his men sowed cabbage, lettuce and turnips on their exploration trips. Records such as these and others have led to the speculation that some plants, originally thought to be native, may actually be crops introduced by explorers and either preserved by Indians or flourished wild until rediscovered in later years.

Almost all colonizing adventures to the New World carried rye, barley, oats and wheat. Aside from these four grains, early letters from North America show that peas, beans, herbs, plums and nuts prospered in Newfoundland as early as 1578. However, not all settlers found cultivation of European crops so easy. Colonists in Jamestown were unable to produce a successful harvest in 1607 and 1608 until they adapted Indian agricultural techniques the following year.

In 1628, the Endicott Expedition to the Massachusetts Bay Colony took with it seeds of wheat, rye, barley, oats, beans, peas, stones of peaches, plums, cherries, and seeds of filberts, pears, apples, quince and pomegranates, saffron, potatoes, hops, hempseed, flaxseed and currant plants. By 1630, such vegetables as cabbage, turnips, lettuce, spinach, radish, onions, peas and beans were growing in the gardens of Massachusetts. In 1688, rice was planted in South Carolina. The rise of the rice industry, like that of the cultivation of tobacco in Virginia, meant economic success for these two colonies. Sugar cane was introduced early in the 18th century to Louisiana — arriving via troopships carrying sugar cane to Jesuits from their counterparts at Santa Domingo.

Most common fruits not hardy in the North were started by early colonists in the Deep South. Among these were citrus fruits, figs and pomegranates which were originally brought to the New World by Christopher Columbus when he founded the Spanish Colony of Hispania (Haiti). Such fruits as bananas, pineapples and avocadoes were not tried until the late 1800's.

Other factors contributed to the development of food crops in the New World. Founded in 1760, The Royal Botanic Gardens at Kew in west London made many contributions to America through its pioneer work in plant introduction. A prime purpose of the Garden was to assist in the dissemination of valuable plants among the British Colonies. These plants became part of the green cargoes, often traveling on specially equipped ships.

It is about this same time that British naturalist, John Ellis, published his book, "Directions For Bringing Over Seeds and Plants . . . With a Catalogue of such Foreign Plants as are Worthy of Being Encouraged in Our American Colonies", which explained how to pack seeds in beeswax in order to prevent spoilage on long sea voyages.

By the 1700's agricultural societies had been formed in the colonies. Many of America's early

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*Blanche Dearborn (Mrs. E. W.) is a member of Unit 31, the Grace T. Dowling Unit, for whom she prepared this paper.

statesmen were keenly aware of the agricultural problems facing the young nation. Washington, Franklin and Jefferson, Madison and John Quincy Adams were among them, working with agriculturists and agricultural and scientific societies. On his part, Washington recommended that a branch of the national Government be organized to care for the interests of farmers. We know it now as our Department of Agriculture. He also imported many plants from England for the improvement of his estate at Mt. Vernon, where he used greenhouses to protect tropical plants, grapes and citrus trees.

Franklin is credited with two "first introductions" — namely rhubarb and Scotch kale. In a letter written by Franklin to a fellow colonist, Franklin states, "I hope the Rhubarb you have sown and distributed will be taken care of. There seems to be no doubt of its doing well with us as in Scotland. Remember that for use the Root does not come to Perfection of Power and Virtue in less than seven years. The Physicians here who have try'd the Scotch, approve it very much and it equals the best imported."

Jefferson's contributions were more extensive. "Thomas Jefferson's Garden Book, 1776-1824," which has been reprinted to coincide with our Bicentennial, details his garden activities and plans for developing grounds and garden at Monticello. He believed that the agrarian way of life was necessary for a stable country, economically and politically, and thus was active most of his life collecting and exchanging seeds and plants with agriculturists and horticulturists abroad. Perhaps his most noteworthy plant introductions were the olive and dry or upland rice. Up until this time, wet rice, which was grown in the Carolinas, was accompanied by malaria. By the time of his death, Jefferson's new dry rice, which he imported from China, Africa and Egypt, was growing all over upper Georgia. Since he considered an oil crop to be a necessity, he had olive plants sent from France in 1789-90 to South Carolina and Georgia. In addition to searching for new crops to introduce, Jefferson also promoted English agricultural methods.

Our gardening heritage comes from people with an unquenchable desire to try something new! Thus from the seeds, roots and stones brought over from Europe by early settlers and explorers, we have developed numerous strains of crop plants suited to climactic and soil conditions in North America. Our plant heritage is global — thanks to a certain curiosity and spirit (and need) in man to cultivate the soil.

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Botanical Gardens

(Continued from p. 26)

cies in revegetation and in horticulture — in short, facing up to a new participatory role for man rather than the crude domination of earthly ecology.

Our wish to preserve the wholeness of the world biota does not assume that the future can be fully predicted or planned by human beings; it is questionable whether mankind is capable of managing the world much more wisely in the future than at present. Any future environmental harmony will be based on recognition of diversity and complexity in natural, social, and cultural environments. However, achievement of that consciousness must begin with squarely facing the fact that as individuals, societies, or humankind we are not yet organized to appreciate and use our natural, cultural, and environmental complexity and diversity. In the meantime, botanical gardens must help restrain human destructive impulses and powers so that the natural world can create a future consistent with its evolved past.

Lewis and Clark, Botanists — by Order of the President!*

DONALD H. CLARK

Scientific investigation was a secondary mission of the Lewis and Clark expedition, not the primary objective as with the technically well-staffed and equipped Wilkes expedition and several others that operated from ships. Lewis and Clark were soldiers proceeding under orders, and their Commander-in-Chief, Thomas Jefferson had expressed keen interest in the plant life of the unexplored Northwest. The two captains followed orders and botanized to the best of their limited ability and equipment.

If President Jefferson had been indifferent to botany, it is probable that the expedition would have confined its biological activities to the few unusual new plants and animals that appeared to bear high commercial value. However, the President was not only deeply interested in botany, but active in plant research. He had encouraged the French botanist, Andre Michaux, to explore the West in 1792 in search of unknown plant life, and was dismayed at Michaux's recall from the trip by the French Minister to the United States.

Jefferson had plants brought to the United States from France, Scotland and the tropics, and raised many of them in his own gardens at Monticello. "Botany, I rank with the most valuable sciences," he stated in a public address.

It obviously would be unfair to compare the botanical discoveries of Lewis and Clark with those of other early explorers who were accompanied by skilled botanists. Meriwether Lewis, with all his natural curiosity and keen interest in biology, knew little of taxonomy or of scientific nomenclature. William Clark admittedly knew much less. "There are several species of fir in this neighborhood," he wrote in the expedition journal while camped at Fort Clatsop, "which I shall describe as well as my slender bottanical skill will enable me . . ."

The expedition, during its twenty-eight arduous months on the trail, had no facilities for safeguarding botanical collections or for sending them back to civilization, except one box of numbered specimens relayed to President Jefferson from Fort Mandan. Neither could they carry reference books, plant presses and other scientific equipment. Their extensive botanical collection made during the early part of the trip and cached near the Missouri River, had deteriorated so badly when they recovered it on their return two years later that it was useless.

The expedition's journal carries much botanical description in the handwritings of both Lewis and Clark, but few scientific names. The two leaders, quite advisedly, left identification to skilled botanists assigned to this task by the President. Several such scientists, particularly Pursh and Knowlton, added considerably to their professional status through identification and written description of the expedition's collection.

Jefferson was evidently satisfied with the botanical achievements of the expedition. "Lewis's journey across our continent to the Pacific has added a number of new plants to our former stock," he wrote Madame La Comtesse de Tesse in December, 1813, "and all Lewis's plants are growing in the garden of Mr. McMahon, a gardener of Philadelphia." The President was evidently somewhat modest; quite a few of them were growing in his own garden at the time.

Bernard McMahon and another skilled horticulturist, William Hamilton, did propagage most of the seed that the expedition had collected, but maintained complete secrecy for several years so that Lewis might receive full scientific credit for discovery of any unknowns when his book was published. Unfortunately, nearly all natural history references were omitted from the first printing of the expedition journals. Dr. B. S. Burton had been delegated the job of writing up all scientific material, but he evidently did nothing at all due to failing

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*Our bicentennial year has prompted us to reflect upon events of our past. This article, reprinted from an earlier *Bulletin* (Vol. XIII, No. 3, Fall, 1950), reminds us of a famous expedition and focuses upon a too-little-known aspect of that expedition. Those who wish to read more about it are referred to *Lewis and Clark: Pioneering Naturalists* by Russell Cutright (U. of Illinois Press, 1969) and to *Thomas Jefferson's Garden Book* (American Philosophical Society, 1944).

Dr. Clark, author of this article, was the first director of the Institute of Forest Products at the University of Washington and a forestor of note. He died in 1965.

This reprint also illustrates the wealth of information to be found in earlier *Bulletins.* Many issues are still available at a nominal price at the Foundation office.

health. He died soon after the volumes were published.

About 150 of the dried specimens collected west of the Rockies and on the expedition's return trip were shown by Lewis to the eminent German botanist Pursh at McMahon's home in Philadelphia. Pursh stated that not over a dozen of the species had been recorded as native to North America at the time, and he made numerous drawings of them for his own files. Later he secured permission to take most of the collection to England, where he used them in compiling his "Flora Americae Septentrionalis." This was published in 1814 while Great Britain and the United States were at war, so the collection obviously could not be returned at the time. It later found its way to the Academy of Natural Sciences in Philadelphia, where it still reposes.

Of the two captains, Lewis was obviously the more enthusiastic about botany. When he was accidentally wounded on August 12, 1806, Lewis entrusted the upkeep of the journal to Clark, but, according to historians, "found strength for one last extensive botanical note, lengthy and highly technical, on 'a singular cherry which is found on the Missouri in the bottom lands.' "

In the autumn of 1809, three years after the termination of the expedition, Jefferson wrote Meriwether Lewis that the English botanist Bradbury was being sent to the United States by the Botanical Society of Liverpool. He suggested in the letter that Lewis consult Bradbury at length regarding his western botanical observations, but Lewis, sick and embittered, ended his own life before Bradbury arrived.

Many native plants of Northwestern United States retain the names of the two explorers: Clarkia, the Evening Primrose; Lewisii, the Bitterroot; a Syringa, *Philadelphus Lewisii;* and a *Mimulus, M. Lewisii.*

To appreciate what Lewis and Clark accomplished in botanical exploration, one must read the journal of their expedition page by page. Few men would have paid the least attention to any matter not touching on their own safety during the 3,555-mile journey over mountains marked only by Indian trails, on swift unknown rivers with dangerous falls and rapids, and surrounded constantly by Indian tribes in various stages of hostility toward white men.

But the two captains were under orders which they obeyed. By so doing they expanded the botanical knowledge of their period to an appreciable degree. ♦

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SOME OF OUR FAVORITES

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Rosa 'Dirigent'

*NEIL W. ADAMS**

"Rose is a rose is a rose is a rose." Is this famous quotation nonsense or a profound exposition? What else need be said about the rose for the word immediately brings to mind an image.

If your idea of a rose is firmly fixed, read no further for I would not want to destroy a lovely image. The genus *Rosa* is so magnificently diverse that it can fulfill all sorts of purposes and effects in the garden and landscape. With a range that extends from the subtropics to the Arctic Circle, *Rosa* contains plants that vary from the diminutive minature roses that can fit in a teacup to *Rosa gigantea* which rises 50 feet from forest floors to blossom in the sun.

If at the word "Rose" you think hybrid tea, I would direct you to the climber. If you think floribunda I should suggest a grandiflora. Or if you know all these, may I recommend a modern shrub rose. As the poet writes:

The rose that all are praising,
  Is not the rose for me;
Too many eyes are gazing
  Upon the faultless tree.
But there's a rose in yonder glen
  That scorns the gaze of other men;
For me its Beauty saving, —
  Oh! that's the rose for me.
        T. H. Bayly

In the truest sense all roses are shrubs. But in the present usage a "shrub rose" is one whose growth is both free and bushy. With ordinary care they may achieve a size of five to eight feet; therefore, they may replace or combine with such shrubs as forsythia, deutzia or spirea and thus extend the bloom season of the shrub border. The modern shrub rose repeats its bloom from June until a good freeze occurs. In addition, they are usually hardier and more disease resistant than the average garden rose.

A specific example, and one of which I am very fond, is the shrub rose, 'Dirigent' produced in Germany by Tantau, the hybridizer of 'Tropicana.' This beauty has large clusters of blood red blossoms. On two occasions, sprays of this variety were mistakenly placed in the floribunda section of rose shows and earned blue ribbons! The petals fade hardly at all before falling. This shrub is hardier than most 'bush' roses, and its large dark green foliage is quite fungus resistant. Though it is a shrub, over a period of years I have gradually built it up so that it covers an arch over our front walk as a friendly floriferous welcome to our visitors.

There are some older shrub roses of near equal merit which could be recommended for the modern garden. These exemplify the merit of roses as woody shrubs. Such roses should be represented in an arboretum which "protects and preserves botanical collections" of woody plants.

A proposal has been made to the effect that roses be represented in our great Arboretum to make it more representative of the beautiful world of woody shrubs. This suggestion is not

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*Dr. Adams, a Bellingham, Wa. member of the Foundation's Board of Directors, is an accredited judge for the American Rose Society, a hybridizer of roses and an acknowledged expert in rose culture.

without precedent because formerly there existed a planting of old garden and species roses as part of the Arboretum. This should be replaced in a fuller manner with a historic garden representing roses through the ages. There is no such collection in the Northwest; actually, there are only a few such valuable educational and research collections on this continent. In addition to its educational value, an assemblage of roses would offer a precious source of genes for the hybridizer.

Whereas this may not be a project for today or the immediate tomorrow, I feel it should be a commitment for the future development of the Arboretum. If you agree, please let the directors know!

'For if I wait,' said she,
'Till time for roses be,
For the moss-rose and the musk-rose,
What glory then for me
In such a company?'
E. B. Browning

A Delightful Little Stutterberry
Vaccinium oxycoccos L.

*NAN BALLARD**

Do you know *Vaccinium oxycoccos* L., our little native cranberry?

If I were to make up a name for it, I should call it Stutterberry which is certainly as logical a common name for a plant sometimes called *Oxycoccus oxycoccus* as the varying names Marshwort, Finberry, Craneberry or Mooseberry as it is known in different parts of the world. Linnaeus placed it under *Vaccinium*, but somewhere along the years it romped in and out of its own genus as *Oxycoccus oxycoccus*. Currently, according to Hitchcock, it is back in the genus *Vaccinium* under the family Ericaceae. In some books, it is listed as *V. o.* var. *intermedius*. Whatever its name, it is our delight.

Native to bogs and moist areas across Canada and northern United States, it is, in fact, considered circumboreal, endemic all around the North Pole. According to Lewis Clark, "Wild Flowers of British Columbia," the pollen of this wee charmer has been identified in prehistoric bog deposits dating back several million years.

Often reluctant to flower and fruit in our gardens, it is sheer joy when it does. The tiny dainty flower, its delicate pink petals as deeply reflexed as those of the Fawn Lily, is very unlike the bells of most of its vaccinium cousins. The diminutive leaves, less than ½ inch long, narrow, alternate, dark green above and whitish underneath, are scattered along the reddish, wiry, thread-like stems which make a loose, prostrate mat. The plump, globose fruit is red and somewhat acid; for this reason Linnaeus gave it it's name from the Greek words meaning sour or bitter berry. After the first frost, the berry is quite palatable even before cooking.

V. oxycoccos likes our acid peaty bogs and swamps where it can get lots of water during its growing season and a chance to dry out somewhat during the summer. However, it has been known to creep over hot, dry lands where nothing else would grow. In Upper Preston one fantastic specimen clings to an old log extending out over a man-made lake where it flowers and fruits in gay abandon. Its landlord, however, is one of those fortunate beings with green fingers who has only to touch a twig to have it take root, sprout, flower, fruit, and do all those other tricks attributed to it in the textbooks. The rest of us poor clodders can be ecstatic over a scattering of bloom and a single bright berry.

Though you may never harvest your own cranberry sauce for Thanksgiving dinner, you will be forever thankful if you can create a home of its own for *V. oxycoccos*.

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*Nan Ballard (Mrs. Page) is a member of Unit 74, the Pat Ballard Unit.

Her Garden Was Her Delight

The LakeCliff Home of Myrtle DeFriel

*MYRTLE DE FRIEL**

My garden is almost my whole life. How thankful I am as I grow older to have such an absorbing hobby, one that calls for both mental and physical activity to keep me from becoming a bore.

About 28 years ago I decided I did not want to spend my husband's retirement years on a traditional Seattle suburban street and confine gardening to a small city lot. We found a secluded spot in Medina with room to breathe. It had a woodsy winding path to the lake and an acre "topside" with the native trees still inact. In 1947 we moved out to the small Early American cottage we had built on the lake shore. And LAKECLIFF was born. Three years later when we had finished clearing to make room for shade-loving rhododendrons, begonias, primroses and fuchsias around the house, I felt the urge to start the long-hoped-for garden topside.

About the same time I heard that the Arboretum Foundation was sponsoring a landscaping class by Oliver Ester. When I applied I was told the class was already filled but that there was still some room in an advanced class. To learn if I were ready for the advanced class, Mr. Ester's assistant asked if I knew *Arbutus unedo*. When I didn't, he said they would squeeze me into the beginner's class.

Those of us who took Oliver Ester's courses were lucky because the Northwest had never before had such a thorough teacher of landscaping. He began teaching as an assistant to John Grant, whose "Trees and Shrubs for Pacific Northwest Gardens" has been the "garden bible" for so many of us since its publication in 1943. From that time on I became fascinated with the idea of creating a garden in the right way. Mr. Ester began by thoroughly familiarizing us with the many plant materials suitable for our climate, then went on to their needs and their appropriate groupings and combinations. His last course was given in the old clubhouse just before his death.

In another course taught by Mr. Hansen, assistant to Dr. Hanley, former director of the Arboretum, we were encouraged to draw scale plans for our gardens. In my garden I first laid the paths out to scale. Because my acreage is long and narrow — 75 × 500 feet — I made the paths curved to help counteract the narrowness. The paths also have enticed visitors to go on to see what is beyond the next turn. This created interesting planting areas of various shapes and sizes. To the many native evergreens and dogwoods left on the land, I added crabapples, flowering cherries, plums and four other varieties of dogwood.

Due to my neighbor's tall evergreens to the south, the garden is mostly a shade garden. Shade-loving plants such as rhododendrons, azaleas, pieris, kalmias, acubas and skimmias form the background plantings. Below them are smaller varieties of plant material and ferns for ground cover.

A pool was added, but it became so shady the water lilies refused to bloom. Soon wild ducks discovered the fish, so that they too are gone. Now it is just a woodsy fern-edged pond.

There is always some color in the garden each month of the year. January brings out Viburnums: *tinus, bodnantense,* and *fragrans;* sasanqua camellias, *Prunus autumnalis, Hamamelis mollis.* Three shades of pernettya berries are still making a display with Mediterranean heather at their feet. By February *Cornus mas* is starting to show its dainty yellow blooms. Purple *Rhododendron mucronulatums* flower beside it, all underplanted with 'February Gold' daffodils, purple and yellow crocus, purple 'Wanda' and yellow 'Dorothy' primroses. Several rhododendrons begin to bloom as early as February and I always hope they will escape a frost which will turn them brown. From then on many rhodos bloom extending the season through June.

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*Octogenarian Myrtle DeFriel's (Mrs. J. T.) account of her garden, prepared for Unit 41, the Frances MacBride Unit, indicates why she has been inspirational to many gardeners.

In March and April many camellias, now 10 to 12 feet tall, furnish bouquets for my apartment-confined friends. *Helleborus orientalis* in many shades makes a good ground cover in the sunnier areas of my garden while several types and colors of primroses, and various small iris and narcissus peep out adding color and texture.

April brings out the cherries, dogwoods, *Pieris japonica*, some of the crabapples, heathers and many rhodos. But May is the month of crowning glory in my garden. Scores of rhododendrons are blooming. Dwarf sargeant crabs, *Cornus kousa* and hundreds of tulips underplanted with forget-me-nots fill the perennial border. Later in the month many varieties of azaleas will be ablaze with color.

In June the roses, fibrous begonias, snapdragons, sweet allysum and lobelia will fill the places where the tulips bloomed. By July the back of the perennial border will be a mass of color with phlox, day lilies, michaelmas daisies and dahlias. The roses, Japanese anemones and astilbes will bloom through September. By October and November the dogwoods, a sweet gum and sumac will be flaunting their brilliant colored leaves.

The garden takes a rest in December but the interesting line pattern of a birch or enkianthus will be better appreciated against the sky for there is less competition. My garden has been my delight for the 20 years I have been developing it. In addition, contacts through the garden have brought me wonderful friends.

I am still making changes, for some shrubs have outgrown their alloted space, or I may change a combination which seemed right at time of planting, but does not please me now. Except for the initial clearing of large brush and some alders I have done the rest of the clearing and planting with only the help of high-school boys. One area at a time was developed starting at the front lake bank, and only in the past five years have I finished the back area to my satisfaction with a sign on the path greeting visitors with "Welcome to Myrtle's Garden."

The sophisticated landscape designer or the perfectionist will find many flaws. But I have tried to avoid a "speciman" garden, and instead have made a strolling garden or a typical English woodland garden similar to one my grandfather must have planted in Devonshire 100 years ago. Come visit my garden next May. ▲

Unit Conversations

Jeanne Gardiner reports that the net profit from the 1975 Fall Bulb Sale was $4,500.00. (This is a correction from the last issue.) Plans are already under way for the 1976 sale. In August volunteers are invited to help sort, address and prepare the catalog for mailing. Helpers are needed all summer to pot the native bulbs and to count and sack Holland bulbs.

If you can offer even one day's help call Jeanne at 822-9704.

Donations of bulbs are welcome. Pink scilla (no blue or mixed) is especially needed. Mixed daffodils would be welcomed also. When dividing beds in July or August, remember to put surplus aside for the Bulb Sale.

Six cutting parties to teach propagation techniques will be offered this summer — two each in June, July and August. Further information may be obtained by calling the Arboretum office at 325-4510.

The Arboretum Explorers will continue their educational walks all during the summer. They will begin at the Arboretum offices at 10:00 AM every fourth Wednesday. Everyone is invited.

Thirty-three new members signed up at the Annual Plant Sale, bringing the Arboretum Foundation membership to 2,885. The Unit Council has 1,476.

A new slide program is available in the office. It is "Wild Flowers of the Northwest" and runs approximately one hour. Two other programs are "Let the Good Bugs Work for You" and "Early Winter Blooming Plants." Both are about a half hour long. Many other slide programs are also available and may be checked out at the Foundation office.

The Northwest Native Study Group has recently been re-named the May Guy Northwest Native Study Group in honor of its founder, Dr. May Guy. This group will be having extra study sessions to learn more about the plants they observe on their field trips. Margaret Miller will lead much of the study work.

MARIAN ADDISON

Book Reviews

COLOR IN THE SKY – FLOWERING TREES IN OUR LANDSCAPE, Edwin A. Menninger, D. Sc., Horticultural Books Inc. Florida, 1975. $14.95

When the author, Edwin A. Menninger, and his family moved to Stuart, Fla. in 1922, Mrs. Menninger wanted to landscape their garden with trees of a variety of color. Thus Menninger set out to learn about conspicuous flowering trees and their adaptability to a tropical or subtropical environment.

Half a century ago, flowering trees were scarce in Florida; the treescape was predominantely green and local nurseries maintained a fraction of the tree material available today. Menninger's quest proved to be more than a weekend project and eventually resulted in the establishing of a nursery where Menninger grew, tested and made available several hundred kinds of exotic woody plants from seeds he procured from Mexico, Central and South America, Asia, Africa, Australia, New Zealand and the Pacific Ocean Islands. Menninger estimates that in his lifetime, he introduced or reintroduced some 200 kinds of trees to the tropical and subtropical landscapes of America. For his work, he has received citations from numerous horticultural societies, among them: the Thomas Barbour Medal from the Fairchild Tropical Garden, a commemorative bronze medal from the Rio de Janeiro Botanic Garden, the Reasoner Cup from the Florida Nursery and Growers Association and the Thomas Roland Medal from the Massachusetts Horticultural Society.

With a warm foreward written by George H. M. Lawrence, president of the Fairchild Tropical Garden, "Color in the Sky" covers 25 years of contributions to horticultural publications. Menninger introduces us to some of the most outstanding flowering trees in the world and invites us to experiment with exotic rather than bland tree species in our own gardens. Each tree cited is accompanied by one or more illustrations and a text about Menninger's own experiences with the particular plant and its cultural needs.

"In the process of learning about flowering trees for warm climates and growing hundreds of thousands of them," writes Menninger in the prologue, "I wrote fifty-some articles about them and their decorative possibilities to enlist public interest. . . . They are printed here just as they originally appeared, including the many inconsistencies. . . . The reader absorbed in the trees and their possibilities on the landscape will overlook variations and carelessness. After all, the flowers are the things to see."

And indeed the printing, pictures and index give evidence of the carelessness cited, but definitely, "the flowers are the things to see"!

RUTH VOROBIK

THINKING LIKE A MOUNTAIN, by Susan L. Flader. University of Missouri Press, Columbia, Missouri. 1974.

In "Thinking Like a Mountain" the author writes of the development of an ecological attitude in a man who became one of the foremost conservationists of this country. Susan Flader explores the way in which Aldo Leopold formed his positions toward forests, wildlife, wilderness and use of the land. It is a scholarly presentation and is both biographical and also philosophical. Leopold was able to integrate the two strands of the scientific and the conservation imperative into one — an ethic for the land.

Aldo Leopold is best known for his two outstanding works, "A Sand County Almanac" and "Round River," as well as a number of small essays. These consist largely of nature sketches showing his attitudes toward man and the land. Now an established environmental classic, "A Sand County Almanac" reads like poetry. It tells of the changes in nature and their effect upon the ecological balance. Leopold writes of man's destructive interference with nature and he concludes with a plea for a wilderness ethic. He almost despairs of the slow progress made in establishing land ethics. Thus he writes, "Conservation is getting nowhere because it is incompatible with our Abrahamic concept of the land. We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect. Perhaps a shift of values can be achieved by reappraising things unnatural, tame and confined with things natural, wild and free."

In this excellent review of Leopold's life, Dr. Flader speaks of the forces in his life leading up to and conditioning his views. As a graduate of the Yale Forestry School he became a forest administrator with the U.S. Forest Service. But utilizing forest products was to him secondary to the developing interest in land use as a whole. Later he became a professor at the University of Wisconsin. His graduate courses attracted students eager to learn more of his views on land usage. To Dr. Leopold there was no such thing as plant-ecology, or animal-ecology, or human-ecology; it was all one. "He was," as Dr. Flader put it, "shaking wildlife technicians out of their mental grooves." At this point in his life, the use of the land, of forests and wildlife, of wilderness and people became a compelling interest. Our present trend, national, state and regional toward intelligent land-use planning has been influenced by Leopold's philosophy. In a short article entitled, "Aldo Leopold, Growing Taller With the Years," published in the "Living Wilderness," Paul H. Oehser says that Leopold's ideas have reached far beyond the "minority" of which he then considered himself a member.

It was in his essays that Aldo Leopold spoke out bravely for his convictions. In "The Land Ethic," perhaps his most important essay, he said, "A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise." His continuing theme throughout his writings was an intelligent humility toward man's place in nature. He was a pioneer in setting aside large unspoiled areas of land. One of the original eight founding members of the Wilderness Society, he did not live to see passage of the Wilderness Act of 1964 by the Congress. But it was in large part due to his study and research that made the passing of this bill possible. Many of his contemporaries were subscribing to these new-found theories, such as John Muir, Sigurd Olson and others for whom the wilderness was the hard core, the bench mark in this new philosophy. They saw, as he did, that only national protection would save these vulnerable areas from the peril of overdevelopment. Perhaps Leopold's most enduring contribution was his concept of land health as a self-regulating system.

It was my very good fortune to have met Dr. Leopold some years ago. He was the principal speaker at a conservation forum sponsored by the Garden Club of America. He was a dynamic speaker, confident that his convictions about ecology sprung from what was ethically right rather than economically expedient. He used a new term which he called an ecological conscience which he felt touched the foundations of individual conduct. In an article in the Bulletin of the Garden Club of America in 1947 he stated, "Ecology is the science of communities, and the ecological conscience is therefore the ethics of community life . . . It is an affair of the mind as well as the heart. It implies a capacity to learn, as well as emote about the problems of conservation."

ROSAMOND P. ENGLE

DRIED FLOWER DESIGNS, Brooklyn Botanic Garden Record, Plant & Gardens, Vol. 30, No. 3 (Autumn '74). $1.50

"Dried Flower Designs" is a collection of articles from Canada, England and the United States on the art of growing, collecting, drying and arranging plant material. Compiled by guest editor, Barbara Laking from Canada's Royal Botanical Garden, the booklet is easy to read and understand. Plants are identified by both their botanical and common name, the black and white illustrations, as well as the color photographs in the center, are sharp and informative. Writes Brooklyn Botanical Garden's editor in the preface: ". . . the art of drying has had a marked revival in recent times. It has become a bit sophisticated because of new or refined techniques — the wealth of different plants available to us today — but the principles are much the same as in colonial times. By looking at plants through the eyes of a dryer, new dimensions in horticulture may be found."

RUTH VOROBIK

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